

LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (original) A lubricating oil composition comprising a lubricating oil and as a metal protectant, an additive selected from the group consisting of

(a) a shelf stable haze free liquid of an overbased amorphous alkaline earth metal carbonate of a fatty acid and

(b) a powdered overbased amorphous alkaline earth metal carbonate of a fatty acid isolated from said liquid, said liquid or powdered additive prepared according to the process of

(i) reacting an alkaline earth metal base and a fatty acid with an equivalent ratio of metal base to fatty acid being greater than 1:1 in the presence of liquid hydrocarbon,

(ii) carbonating the mixture to produce amorphous alkaline earth metal carbonate,

(iii) adding during carbonation a dispersion of alkaline earth metal base, a liquid hydrocarbon and an aliphatic alcohol having at least 8 carbon atoms in relative amounts at a controlled rate of alkaline earth metal base addition to produce a stable haze free liquid reaction product, and

(iv) removing water from the reaction product to obtain said liquid additive or powdered additive.

2. (original) The lubricating oil composition of claim 1 wherein said liquid reaction product is filtered to produce a thermodynamically stable liquid at a product filtration rate of at least about 300 ml per 10 minutes.
3. (original) The lubricating oil composition of claim 1 wherein said fatty acid is a C₁₂-C₂₂ fatty acid.
4. (original) The lubricating oil composition of claim 1 wherein said fatty acid is oleic acid or isostearic acid.
5. (original) The lubricating oil composition of claim 1 wherein water is removed to provide a microemulsion product having less than about 1% by weight water of the total product.
6. (original) The lubricating oil composition of claim 1 wherein said alkaline earth metal is selected from the group consisting of calcium, barium, magnesium and strontium.
7. (original) The lubricating oil composition of claim 1 wherein said alkaline earth metal is calcium.

8. (original) The lubricating oil composition of claim 1 wherein the overbased salt is calcium oleate/carbonate.

9. (original) The lubricating oil composition of claim 1 wherein the overbased salt which is essentially free of a phenol or phenolic derivative.

10.(original) The lubricating oil composition of claim 1 wherein said aliphatic alcohol has 8 to 14 carbon atoms.

11.(original) The lubricating oil composition of claim 10 wherein the alcohol is isodecanol.

12.(original) The lubricating oil composition of claim 11 wherein the dispersion further contains a glycol or a glycol ether.

13.(original) The lubricating oil composition of claim 12 wherein the glycol or glycol ether is selected from the group consisting of diethylene glycol monobutyl ether, triethylene glycol, dipropylene glycol, diethylene glycol monomethyl ether, ethylene glycol monobutyl ether, and mixtures thereof.

14.(original) The lubricating oil composition of claim 1 wherein said reaction product is formed by reacting on the basis of the final reaction mixture an amount of an alkaline earth metal base selected from the group consisting of about 15-30% calcium hydroxide, about 12-24% magnesium hydroxide, about 25-50% strontium hydroxide, and about 35-50% barium hydroxide, and mixtures thereof.

15.(original) The lubricating oil composition of claim 14 wherein the alkaline earth metal base is calcium hydroxide and the fatty acid is oleic acid.

16.(original) The lubricating oil composition of claim 15 wherein the haze free liquid calcium oleate is a microemulsion having amorphous calcium carbonate within the micelles of the microemulsion.

17.(original) The lubricating oil composition of claim 1 wherein after the addition of the dispersion and carbonation with carbon dioxide the mixture contains

about 15-30% calcium oleate,
about 9-35% calcium carbonate,
about 30-35% hydrocarbon oil,
about 15-18% isodecanol, and
about 4-6% glycol or glycol ether.

18.(original) The lubricating oil composition of claim 17 wherein the dispersion contains about 40-50% calcium hydroxide, about 25-40% hydrocarbon oil, about 10-25% isodecanol and about 0-10% glycol or glycol ether.

19.(original) The lubricating oil composition of claim 1 wherein the additive is in an amount to provide about 0.5 to about 15% by weight of the overbased metal carbonate based on the total weight of the oil composition.

20.(original) The lubricating oil composition of claim 1 wherein the additive is in an amount to provide about 0.5 to about 7% by weight of the overbased metal carbonate based on the total weight of the oil composition.

21.(original) The lubricating oil composition of claim 1 wherein the additive is in an effective amount to protect metal during its lubrication with said composition by neutralization of acid moieties.

22.(original) The lubricating oil composition of claim 1 wherein the additive is in an effective amount to protect metal during its lubrication with said composition by improving detergency.

23.(original) The lubricating oil composition of claim 1 wherein the additive is in an effective amount to protect metal during its lubrication with said composition by improving anti-wear properties.

24.(original) A lubricating oil composition comprising a lubricating oil and, as a metal protectant, an additive of a powdered overbased amorphous alkaline earth metal carbonate of a fatty acid consisting essentially of

isolated solid agglomerated micelles of a complexed salt of an amorphous alkaline earth metal carbonate complexed with an amorphous alkaline earth metal carboxylate of a fatty acid.

25.(original) The lubricating oil composition of claim 24 wherein said fatty acid is a C₁₂-C₂₂ fatty acid.

26.(original) The lubricating oil composition of claim 24 wherein said fatty acid is oleic acid or isostearic acid.

27.(original) The lubricating oil composition of claim 24 wherein water is removed to provide a microemulsion product having less than about 1% by weight water of the total product.

28.(original) The lubricating oil composition of claim 24 wherein said alkaline earth metal is selected from the group consisting of calcium, barium, magnesium and strontium.

29.(original) The lubricating oil composition of claim 24 wherein said alkaline earth metal is calcium.

30.(original) The lubricating oil composition of claim 24 wherein the overbased salt is calcium oleate/carbonate.

31.(original) The lubricating oil composition of claim 24 wherein the additive is in an amount to provide about 0.5 to about 15% by weight of the overbased metal carbonate based on the total weight of the oil composition.

32.(original) The lubricating oil composition of claim 24 wherein the additive is in an amount to provide about 0.5 to about 7% by weight of the overbased metal carbonate based on the total weight of the oil composition.

33.(original) The lubricating oil composition of claim 24 wherein the additive is in an effective amount to protect metal during its lubrication with said composition by neutralization of acid moieties.

34.(original) The lubricating oil composition of claim 24 wherein the additive is in an effective amount to protect metal during its lubrication with said composition by improving detergency.

35.(original) The lubricating oil composition of claim 24 wherein the additive is in an effective amount to protect metal during its lubrication with said composition by improving anti-wear properties.

36. (NEW) The lubricating oil composition of claim 1 wherein the lubricating oil is a synthetic lubricating oil.

37. (NEW) The lubricating oil composition of claim 36 wherein the synthetic lubricating oil is a hydrocarbon oil.

38. (NEW) The lubricating oil composition of claim 37 wherein the hydrocarbon oil is selected from the group consisting of polymerized olefins and interpolymerized olefins.

39. (NEW) The lubricating oil composition of claim 36 wherein the synthetic lubricating oil is an ester.

40. (NEW) The lubricating oil composition of claim 39 wherein the ester is a carboxylic acid ester made from (a) a monocarboxylic acid or a dicarboxylic acid and (b) a polyol or a polyol ether.

41. (NEW) The lubricating oil composition of claim 1 wherein the lubricating oil is a natural lubricating oil.

42. (NEW) The lubricating oil composition of claim 41 wherein the natural lubricating oil is selected from the group consisting of animal oils, vegetable oils, liquid petroleum oils, hydrorefined mineral lubricating oils of paraffinic types, hydrorefined mineral lubricating oils of naphthenic types, hydrorefined mineral lubricating oils of mixed paraffinic-naphthenic types, solvent-treated mineral lubricating oils of paraffinic types, solvent-treated mineral lubricating oils of naphthenic types, solvent-treated mineral lubricating oils of mixed paraffinic-naphthenic types, acid-treated mineral lubricating oils of paraffinic types, acid-treated mineral lubricating oils of naphthenic types, and acid-treated mineral lubricating oils of mixed paraffinic-naphthenic types.

43. (NEW) The lubricating oil composition of claim 1 wherein the lubricating oil is selected from the group consisting of a synthetic lubricating oil and a natural lubricating oil, and mixtures thereof, and the overbased salt is a calcium oleate/carbonate.

44. (NEW) The lubricating oil composition of claim 43 wherein the overbased salt is essentially free of a phenol or phenolic derivative.

45. (NEW) The lubricating oil composition of claim 43 wherein the synthetic lubricating oil is a hydrocarbon oil.

46. (NEW) The lubricating oil composition of claim 43 wherein the natural lubricating oil is selected from the group consisting of animal oils, vegetable oils, liquid petroleum oils, hydrorefined mineral lubricating oils of paraffinic types, hydrorefined mineral lubricating oils of naphthenic types, hydrorefined mineral lubricating oils of mixed paraffinic-naphthenic types, solvent-treated mineral lubricating oils of paraffinic types, solvent-treated mineral lubricating oils of naphthenic types, solvent-treated mineral lubricating oils of mixed paraffinic-naphthenic types, acid-treated mineral lubricating oils of paraffinic types, acid-treated mineral lubricating oils of naphthenic types, and acid-treated mineral lubricating oils of mixed paraffinic-naphthenic types.

47. (NEW) The lubricating oil composition of claim 24 wherein the lubricating oil is a synthetic lubricating oil.

48. (NEW) The lubricating oil composition of claim 47 wherein the synthetic lubricating oil is a hydrocarbon oil.

49. (NEW) The lubricating oil composition of claim 48 wherein the hydrocarbon oil is selected from the group consisting of polymerized olefins and interpolymerized olefins.

50. (NEW) The lubricating oil composition of claim 47 wherein the synthetic lubricating oil is an ester.

51. (NEW) The lubricating oil composition of claim 50 wherein the synthetic lubricating oil is a carboxylic acid ester made from (a) a monocarboxylic acid or a dicarboxylic acid and (b) a polyol or a polyol ether.

52. (NEW) The lubricating oil composition of claim 24 wherein the lubricating oil is a natural lubricating oil.

53. (NEW) The lubricating oil composition of claim 52 wherein the natural lubricating oil is selected from the group consisting of animal oils, vegetable oils, liquid petroleum oils, hydrorefined mineral lubricating oils of paraffinic types, hydrorefined mineral lubricating oils of naphthenic types, hydrorefined mineral lubricating oils of mixed paraffinic-naphthenic types, solvent-treated mineral lubricating oils of paraffinic types, solvent-treated mineral lubricating oils of naphthenic types, solvent-treated mineral lubricating oils of mixed paraffinic-naphthenic types, acid-treated mineral lubricating oils of paraffinic types, acid-treated mineral lubricating oils of naphthenic types, and acid-treated mineral lubricating oils of mixed paraffinic-naphthenic types.

54. (NEW) The lubricating oil composition of claim 24 wherein the lubricating oil is selected from the group consisting of a synthetic lubricating oil and a natural lubricating oil, and mixtures thereof, and the overbased salt is a calcium oleate/carbonate.

55. (NEW) The lubricating oil composition of claim 57 wherein the overbased salt is essentially free of a phenol or phenolic derivative.

56. (NEW) The lubricating oil composition of claim 54 wherein the synthetic lubricating oil is a hydrocarbon oil.

57. (NEW) The lubricating oil composition of claim 54 wherein the natural lubricating oil is selected from the group consisting of animal oils, vegetable oils, liquid petroleum oils, hydrorefined mineral lubricating oils of paraffinic types, hydrorefined mineral lubricating oils of naphthenic types, hydrorefined mineral lubricating oils of mixed paraffinic-naphthenic types, solvent-treated mineral lubricating oils of paraffinic types, solvent-treated mineral lubricating oils of naphthenic types, solvent-treated mineral lubricating oils of mixed paraffinic-naphthenic types, acid-treated mineral lubricating oils of paraffinic types, acid-treated mineral lubricating oils of naphthenic types, and acid-treated mineral lubricating oils of mixed paraffinic-naphthenic types.

58. (NEW) The lubricating oil composition of claims 37, 40, 42, 43, 46, 48, 51, 53, 54, or 57 and wherein the additive is in an amount to provide about 0.5 to about 15% by weight of the overbased metal carbonate based on the total weight of the oil composition.

59. (NEW) The lubricating oil composition of claim 58 wherein the additive is present in an amount to provide about 0.5 to about 7% by weight of the overbased metal carbonate based on the total weight of the oil composition.